

**1. Amendments to the Claims:**

A listing of the entire set of pending claims (including amendments to the claims, if any) is submitted herewith per 37 CFR 1.121. This listing of claims will replace all prior versions, and listings, of claims in the application.

**Listing of Claims:**

1. *(Previously Presented)* A device for on-chip magnetic resonance measurements for use with a first orienting magnetic field, the device comprising a chip, said chip comprising,  
on-chip means for creating a second electromagnetic field to excite precession of oriented spin magnetic moments in a sample to be analyzed, and  
at least one magneto-resistance sensor for on-chip detection of a magnetic precession of the spin magnetic moments about the first orienting magnetic field in the sample to be analyzed.
2. *(Cancelled)*.
3. *(Previously Presented)* The device according to claim 1, the chip lying in a plane, wherein said on-chip means for creating a second electromagnetic field and said magnetic sensor are positioned adjacent each other in the plane of the chip.
4. *(Previously Presented)* The device according to claim 1, the chip lying in a plane, wherein the means for creating a second electromagnetic field comprises a conductor adjacent the magnetic sensor .
5. *(Previously Presented)* The device according to claim 1, the chip lying in a plane, wherein the means for creating a second electromagnetic field comprises two conductors,

each of the conductors being positioned adjacent one of two opposite sides of the magnetic sensor at a same position with respect to the plane of the chip.

6. *(Previously Presented)* The device according to claim 1, further comprising a first orienting magnetic field generator external to the chip.

7. *(Previously Presented)* The device according to claim 1, wherein said chip furthermore comprises an on-chip first orienting magnetic field generator.

8. *(Previously Presented)* The device according to claim 7, wherein said chip has two major surfaces opposite each other, the means for creating a second electromagnetic field and the magnetic sensor being located on a first major surface and the on-chip first orienting magnetic field generator being positioned on the second major surface.

9. *(Previously Presented)* The device according claim 6, wherein said first orienting magnetic field generator is a permanent magnet.

10. *(Previously Presented)* The device according claim 6, wherein said first orienting magnetic field generator is an electromagnet.

11. *(Previously Presented)* The device according claim 1, wherein said magneto-resistance sensor is a GMR sensor.

12. *(Previously Presented)* The device according claim 1, wherein said magneto-resistance sensor is a TMR sensor.

13. *(Previously Presented)* The device according claim 1, wherein said magneto-resistance sensor has an elongated strip geometry.

14. (*Previously Presented*) The device according to claim 6, wherein the first orienting magnetic field generator comprises means to vary a magnetic field strength.

15. (*Previously Presented*) The device according to claim 1, wherein said spin magnetic moments are nuclear spin magnetic moments.

16. (*Previously Presented*) The device according to claim 1, wherein said spin magnetic moments are electron spin magnetic moments.

17. (*Previously Presented*) The device according to claim 1, wherein said spin magnetic moments are coupled-spin magnetic moments.

18. (*Currently Amended*) A method for performing on-chip magnetic resonance measurements, the method comprising:

orienting spin magnetic moments inside a sample in a first orienting magnetic field,

exciting precession of said spin magnetic moments inside said sample to be analysed, and

on-chip detecting of spin magnetic moments precession with a magneto-resistance sensor; and

providing an output representative of the detected spin magnetic moments precession for analysis.

19. (*Cancelled*),.

20. (*Previously Presented*) The method according to claim 18, whereby generating the spin magnetic moments in the first magnetic field, is performed by the first magnetic field being generated external to the chip.

21. *(Previously Presented)* The method according to claim 18, whereby generating the first orienting magnetic field is performed by a magnetic field generator integral with the chip.

22. *(Previously Presented)* The method according to claim 18, whereby exciting precession of spins inside a sample to be analyzed is performed by generating a second magnetic field.

23. *(Previously Presented)* The method according to claim 18, whereby exciting precession of spins inside a sample to be analyzed is performed by sweeping the second magnetic field over at least one of the following: a frequency range, an amplitude range.

24. *(Previously Presented)* The method according to claim 18, furthermore comprising sweeping the first orienting magnetic field over at least one of the following: a frequency range, an amplitude range.

25. *(Previously Presented)* The method according to claim 18, whereby said sample comprises different types of magnetic particles or molecules.

26. *(Previously Presented)* A method according to claim 25, whereby said on-chip detecting of spin magnetic moments precession comprises detecting separate signals originating from different types of magnetic particles or molecules.

27. *(Previously Presented)* Use of the device as recited in claim 1, for biological sample analysis or chemical sample analysis.